Multi-Disciplinary Publishing Institute Pakistan **Vol.** 03, **N0.** 01

Submitted: 30 MAY 2024 Accepted: 21 NOV 2024 Published: 31 DEC 2024

Original Article

Epidemiology and Risk Factors for Hepatitis "C" Virus Infection in Suspected Population Visiting DHQ Hospital Dera Ismail Khan

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Citation

Sami, A., Usman, K., Ul Haq, M.A. (2024). Epidemiology and risk factors for Hepatitis "C" virus infection in suspected population visiting DHQ hospital Dera Ismail Khan. *Open Access Public Health and Health Administration Review*, 3(1), 1-8.

WEBSITE: www.mdpip.com
ISSN: Print: 2959-619X
ISSN: Online: 2959-6203
PUBLISHER: MDPIP

Abstract

The global public health significance of the Hepatitis C virus (HCV) infection is substantial, with varying incidence rates observed in different geographic regions. This article provides a thorough epidemiological inquiry into the prevalence of Hepatitis C Virus infection and the factors that contribute to its occurrence among a population seeking medical treatment at DHQ Hospital in Dera Ismail Khan, Pakistan. A cross-sectional study methodology was employed to collect data from a representative sample of persons who were visiting the hospital. To determine the seroprevalence of Hepatitis C Virus Infection and collect data on possible risk factors, such as demographic features, medical history, and behavioral patterns, a combination of serological testing and structured interviews was utilized. The findings demonstrate a worrisome spreading of hepatitis C virus (HCV) infection among the studied population, as seen by 23.4% of individuals testing positive for Hepatitis C viral antibodies. Moreover, our research has found several noteworthy risk factors, such as the use of injectable drugs, a history of smoking, the receipt of blood transfusions, and undergoing dental surgery**,** among others, that are correlated with an increased probability of contracting Hepatitis C virus infection. The findings offer significant contributions to the understanding of the epidemiological situation of the Hepatitis C Virus in Dera Ismail Khan. They emphasize the necessity of implementing focused prevention, screening, and intervention initiatives. Additionally, they underscore the need to target modifiable risk factors to mitigate the prevalence of HCV in this geographical area.

Keywords: HCV, ICT, Virus Infection**,** Blood Transfusion, IDUs

Introduction

Viral Hepatitis

The term "hepatitis" is commonly used to refer to inflammation of the liver caused by viruses that have a strong preference for liver cells. The two halves of the word hepatitis, "hepatic" for liver and "titis" for inflammation, make up the whole term. The term "hepatitis" describes liver inflammation. It is a viral infection that interferes with the liver's regular operation. When a significant portion of cases with transfusion-associated hepatitis were shown to be unrelated to hepatitis A or B in 1975, the existence of HCV was fully recognized. In 1989, HCV was discovered for the first time in a man's serum that had neither hepatitis A nor B (Ali, Ali, & Khan *et al.*, 2023). A viral illness called hepatitis C damages the liver and causes inflammation there.

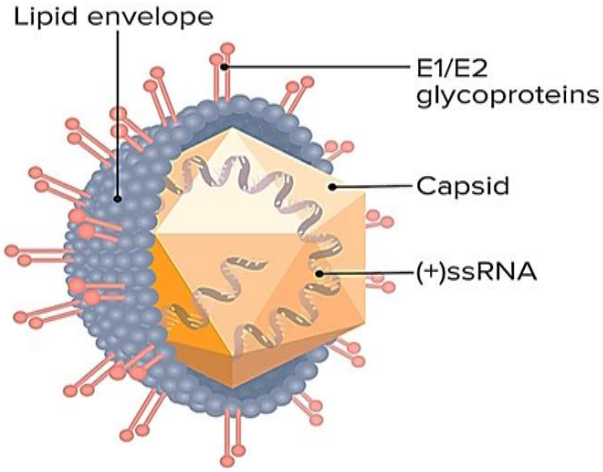
The HCV virus that causes the illness spreads through circulation and can result in acute or chronic infections in the body. Cirrhosis and cancer can also make the situation worse. Antiviral medications are used to treat around 95% of cases, however, illness detection rates are higher in later stages when treatment efficacy is lower (Romanivna, Olehivna, & Yaroslavovich, 2023). Acute hepatitis and chronic hepatitis are two categories of hepatitis C infection depending on symptoms. From the time of infection up to six months later, HCV infection is said to be acute. Only a small percentage of patients (15–25%) will exhibit symptoms of the disease during the acute phase of HCV infection, which is true of 75–85% of cases. The symptoms of acute hepatitis C are frequently widespread and non-specific, which makes it difficult to diagnose the condition. Jaundice, appetite loss, stomach pain, fatigue, flu-like symptoms, and itching are a few of the main symptoms of acute hepatitis C (Khan, Saad, & Ullah, 2021).

Chronic hepatitis C refers to an infection with hepatitis C that lasts for longer than six months. Initial stages of chronic hepatitis C may be symptom-free, whereas later stages are typically characterized by the appearance of symptoms. There is no standard course of treatment for chronic hepatitis C because the response to treatment varies from patient to patient. Additionally, it is known that all chronic HCV carriers will develop fibrosis; however, the incidence of fibrosis differs from patient to patient.

A recent study found that one-third of chronic HCV patients who did not receive treatment developed liver cirrhosis within 20 years, while the remaining one-third did so between 20 and 30 years later. Some factors that affect the rate at which this happens are gender (females tend to progress more slowly than males), age, alcohol consumption, fatty liver, HIV co-infection, and the presence of fat in liver cells (Chatterjee, Majumder, & Basu, 2021). Secondary factors including alcohol, narcotics, poisons, and pharmaceuticals can all induce hepatitis. The liver serves a variety of purposes in human bodies, including bile generation, toxin filtration, drug metabolism, glycogen storage, protein, carbohydrate, fat breakdown, enzyme activation, and bilirubin excretion.

The primary human pathogen that causes both acute and chronic infection is HCV. Because many individuals are unaware that they carry the hepatitis C virus in their bodies without showing any signs or symptoms, it is often known as the "silent killer" (Sohail, 2023). Hepatitis C virus (HCV) is composed of a total of ten proteins, namely three structural proteins (E2, E1, and Core) and seven non-structural proteins (NS4B, p7, NS2, NS5B, NS4A, NS5A, and NS3). The hepatitis C virus is a member of the Flaviviridae family. The hepatitis C virus (HCV) possesses a genome composed of positive-sense, single-stranded RNA consisting of 9600 nucleotides. This viral genome was initially discovered in the year 1989 (Yechezkel, Law, & Tzarum, 2021). (Figure 1).

Figure 1
Structure of HCV



HCV is most effectively transmitted by blood or goods connected to blood. The blood supply was found to be tainted with an unknown substance that causes post-transfusion non-A and non-B hepatitis. Post-transfusion hepatitis C is now quite uncommon in wealthy nations. The success of several donor screening strategies resulted in a drop in the incidence of transfusion-associated hepatitis, which was tracked from 1970 to 1998, from 33% to almost eliminating HCV transmission. Receiving blood products continues to be the major source of HCV infection in underdeveloped nations where it is not practical to test donated blood for the virus. Between 31% and 98% of intravenous drug users tested positive for anti-HCV. In underdeveloped nations, improper therapeutic injections are the predominant method of HCV transmission, which results in 2.34 million HCV infections annually (Khan, Ahmad, & Iqbal *et al.*, 2022). Hepatitis C is the most prevalent cause of liver-related illnesses, and HCV causes hepatocellular carcinoma, a serious global cause of death and morbidity (Axley, Ahmed, and Ravi *et al*., 2018). HCV is a single-stranded RNA virus that belongs to the filoviridae family (Chen, Wang, & Dzakah *et al*., 2022).

Hepatitis C is a serious public health problem in Pakistan, and Dera Ismail Khan District has been identified as one of the high incidence/prevalence locations in Pakistan. The project intends to give insights into the epidemiology of HCV infection in this region and identify risk factors linked with its transmission, which might aid in the awareness of the route of transmission and other associated risk factors in the area.

Review of Literature

The hepatitis C virus (HCV) is pervasive throughout the world and places a significant burden on healthcare systems. A major cause of chronic hepatic diseases, HCV is a member of the Flaviviridae family. This virus has a high mortality rate, causing 350,000 deaths a year on average. Around 1.5 million people worldwide have recently contracted hepatitis C, leaving over 58 million people globally with a chronic HCV infection. Hepatitis was estimated to be present in the general population at 1.0% of the time (Saleem, Aslam, & Siddique *et al*., 2022).

According to estimates, 3.5 million Americans suffer from chronic hepatitis C (Rashiti-Bytyci, Ramadani, & Kalaveshi *et al*., 2023). Infection with the hepatitis C virus (HCV) is a serious public health issue and, tragically, a leading contributor to liver-related morbidity and death that places a strain on healthcare systems in many nations. Globally, 58 (46-76) million individuals have chronic HCV infection, and 1.5 (1.3-1.8) million people get infected for the first time each year. The prevalence of HCV in the general population is 0.8% (0.6-1.0%) worldwide. The Eastern Mediterranean region has the greatest incidence, at 1.6% (1.4–1.8%); 290,000 (230,000–580,000) persons each year pass away from hepatitis C-related causes; only 21% of those with the illness get identified, and only 62% of those who do receive treatment (Abdel-Gawad, Nour, & El-Raey *et al*., 2023).

The World Health Organization (WHO) estimates that 71 million individuals worldwide have this virus. According to WHO estimates, complications from HCV in 2016 resulted in over 399,000 deaths, the majority of which were caused by hepatocellular carcinoma and liver cirrhosis. With a frequency of 4.7%, Pakistan is second among the nations with the highest global HCV prevalence (Ullah, Zia, & Ahmad *et al*., 2022). The human hepatitis virus, a severe public health issue that affects everyone, affects individuals all over the world but is more prevalent in underdeveloped countries. A hepatitis C virus (HCV) infection of the liver is known to have a high mortality rate as well as a high risk of morbidity and mortality (Ullah *et al*., 2022).

An estimated 328 million people worldwide have chronic HBV or HCV infections, the great majority of whom are undiagnosed and untreated. Although there are treatments to stop transmission, it is anticipated that three million new chronic HBV and HCV infections occurred in 2019 and that 1.1 million individuals died, mostly from liver cancer and chronic liver disease brought on by HBV/HCV. Because some of the risk factors for these diseases (socioeconomic variables, risk behaviors, etc.) overlap with one another, there is an overlap in the epidemiology of HBV, HCV infections, and TB (Organization, 2021). The highest rates of HCV prevalence are seen in Africa and the east Mediterranean, whereas just 2% of cases are found in the Americas, Australia, and Western Europe. Even though the incidence of HCV varies throughout the various Asian nations, the total prevalence is thought to be somewhat higher than 2%. Egypt outperforms other countries by having an HCV burden of 14% or higher (Haqqi, Munir, & Khalid *et al*., 2019).

Materials and Methods

In this study, the data has been collected through a designed questionnaire (Appendix-1) from the Patients visiting District Headquarters Hospital's Pathology Laboratory Dera Ismail Khan Pakistan. After filling out the questionnaire, a blood sample was collected from each participant. Serum tests (Anti-HCV Immuno-Chromatography test) have been performed (Khan, Saad, & Ullah, 2021).

Table 1

Data Collection Process

Step	Action
1	Data collection has been done using a structured questionnaire (Appendix-1) administered to patients at District Headquarters Hospital's Pathology Laboratory in Dera Ismail Khan, Pakistan.
2	Upon completing the questionnaire, a blood sample was gathered from each participant.
3	Serum tests, particularly the Anti-HCV Immuno-Chromatography test, have been conducted on the collected blood samples (Khan, Saad, & Ullah, 2021).

Data Analysis

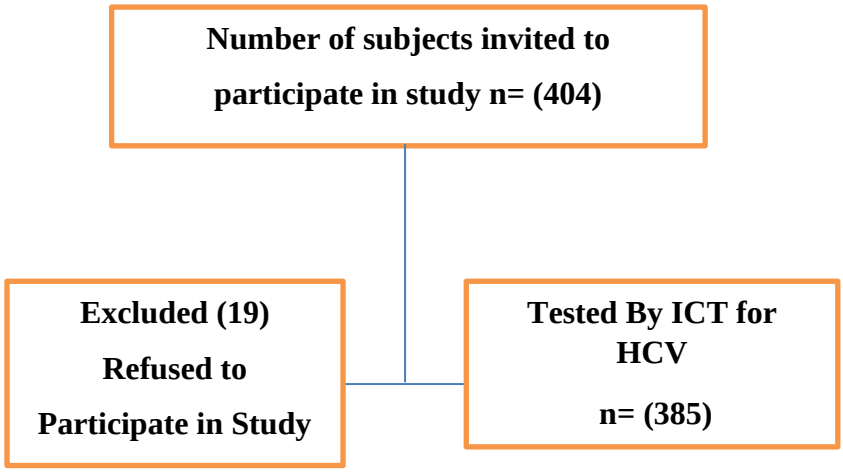
The collected data has been undertaken analysis using suitable statistical methods within the SPSS software. Descriptive statistics, including mean, standard deviation, frequency, and percentage, have been implemented to clarify the characteristics of the study population. Calculations of risk ratio and odds ratio have been applied to the data to ascertain the risk factors associated with HCV infection (McCarthy, McCarthy, & Ceccucci *et al.*, 2022).

Results and Findings

Based on the data, the following are the main results and findings of the study:

Figure 2

HCV Prevalence in District Dera Ismail Khan



HCV Prevalence in District Dera Ismail Khan

A total of 385 blood specimens were collected from the HCV Suspected Population visiting DHQ of 15 to 56 years of age from District Dera Ismail Khan, Pakistan. Out of the total 385 individuals, 212 were males and 173 were female. The blood specimens were then screened to detect the antibodies that are produced against HCV antigen through an Immunochromatographic (ICT) test.

Table 3

HCV prevalence in District Dera Ismail Khan

Prevalence of HCV in Suspected Human Population of DHQ Hospital, D.I. Khan					
HCV	Total	Positive Cases	Prevalence of Positive Cases	Negative Cases	Prevalence of Negative Cases
	385	90	23.4	295	76.62

Graph 1

HCV Prevalence in Suspected Population Visiting DHQ Hospital Dera Ismail Khan

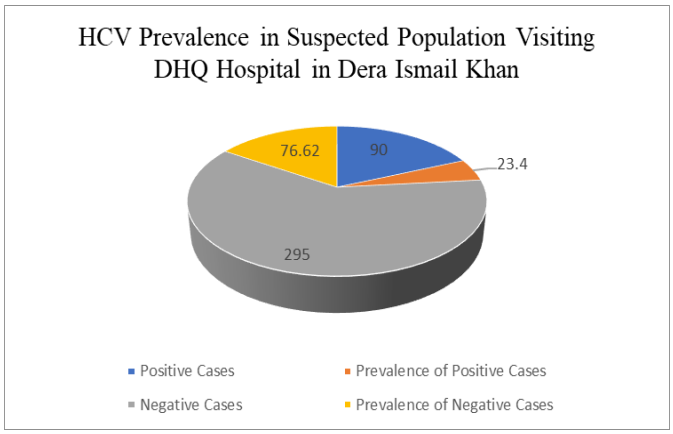


Table 4

Sociodemographic Characteristics of the Participants

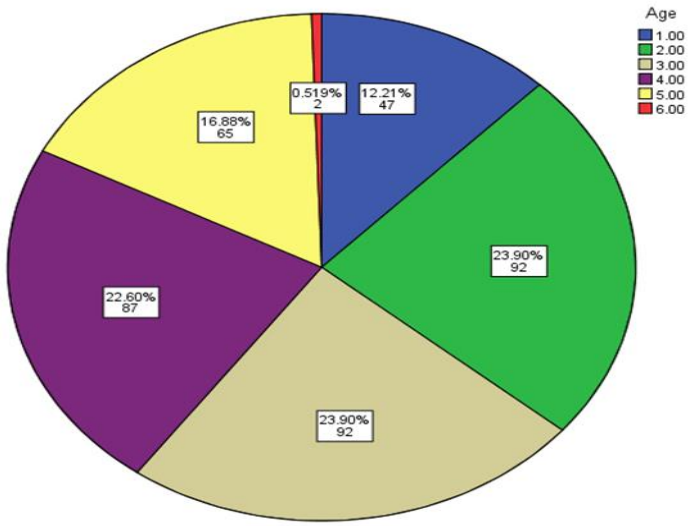
Variables	Category	n (%)
Age	15-26	49 (12.7)
	26-35	91 (23.7)
	36-45	93 (24.15)
	46-55	87 (22.7)
	>56	65 (16.9)
Gender	Male	212 (55)
	Female	173 (45.1)
Province	Punjab	2 (0.5)
	Sindh	2 (0.5)
	Baluchistan	5 (1.3)
	KPK	376 (97.7)
Marital status	Single	47 (12.2)
	Married	277 (71.9)
	Widowed/divorced	61 (15.9)
Locality	Urban	201 (52.2)
	Rural	184 (47.9)
Qualification	Illiterate	130 (33.6)
	Primary	68 (17.7)
	Secondary	51 (13.3)
	Higher secondary	64 (16.7)
	Undergraduate	40 (10.4)
	Graduate	32(8.3)
Working status	Unemployed	246(63.8)
	Retired	50(13)
	Employ	89(23.2)
Family medical history	Yes	18(4.7)
	No	367(95.6)

Table 4 presents a demographic profile of the surveyed population. In terms of age, the majority falls within the 26-55 age range, with 36-45 being the most common group. Gender distribution is balanced, with slightly more males

(55%) than females (45.1%). Most respondents reside in the KPK province (97.7%), while other provinces are sparsely represented. Marital status shows that a significant portion of the population is married (71.9%). In terms of locality, the population is roughly evenly split between urban (52.2%) and rural (47.9) areas. The educational background of respondents varies, with a significant portion being illiterate (33.6%), and employment status indicates that a majority are unemployed (63.8%). Finally, a small percentage has a family medical history (4.7%), while the majority does not (95.6%).

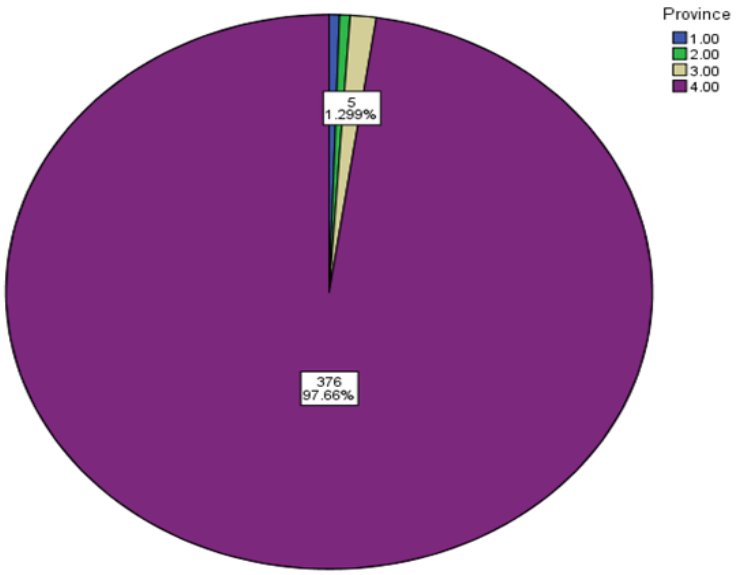
Graph 2

Age-wise Prevalence of HCV



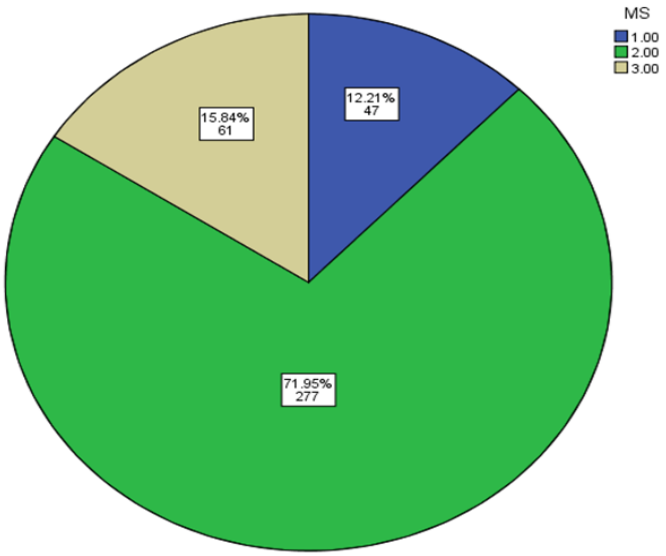
Graph 3

Province-wise Prevalence of HCV



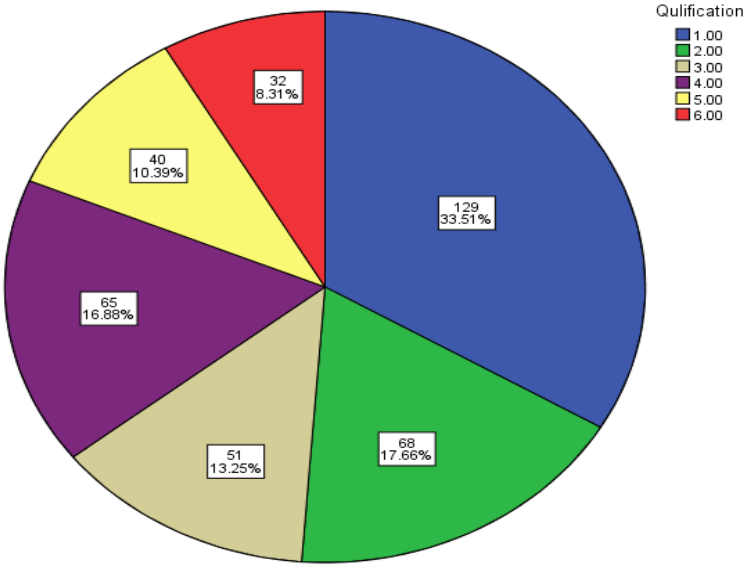
Graph 4

Marital-wise Prevalence of HCV



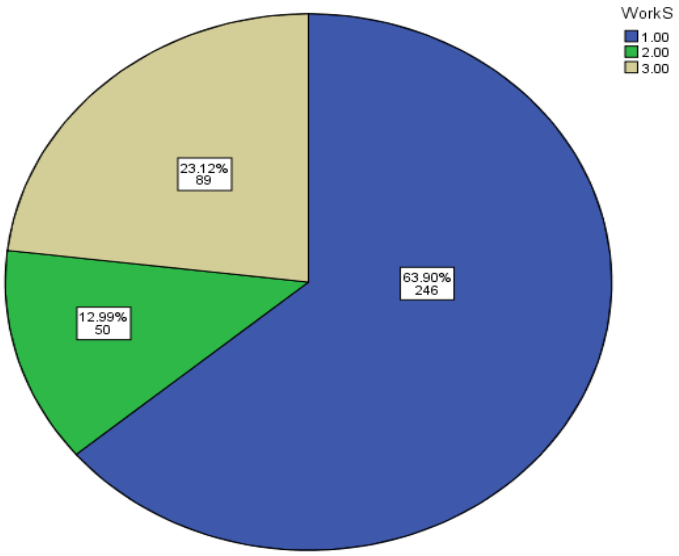
Graph 5

Qualification-wise HCV Prevalence



Graph 6

Working status-wise HCV Prevalence



Assessment Knowledge of HCV Transmission in the Dera Ismail Khan's Population

Our research results provide insights into the surveyed population's knowledge and beliefs about the transmission and spread of hepatitis C. Firstly when asked about the transmission of hepatitis C through casual contact such as kissing or hugging, a significant majority (62.9%) correctly responded "No," indicating an understanding that the virus does not spread through such means, while 37.2% believed it could, indicating a misconception in this area. Secondly, regarding the transmission of hepatitis C through sharing injection equipment like needles and syringes, a substantial majority (74%) correctly acknowledged that this is a possible mode of transmission, while 26% did not recognize this risk. Inquiring about whether mosquitoes can act as vectors for hepatitis C, a vast majority (76.1%) correctly answered "No," indicating awareness that mosquitoes do not transmit this virus, while 24% incorrectly believed they could.

The question about hepatitis C transmission through blood-to-blood contact revealed that 65.1% recognized this as a possible mode of transmission, while 34.9% were either unsure or believed it was not possible. When asked if hepatitis C can be transmitted through airborne means in enclosed environments like crowded buses or lifts, a significant majority (60.8%) correctly responded "No," dispelling the misconception that the virus is airborne, while 39.3% believed it could spread this way. Regarding the most common cause of hepatitis C, a notable proportion (67%) correctly identified sexual transmission as a common mode, while 33% believed otherwise.

Lastly, when asked about the transmission of hepatitis C through non-sterilized equipment during tattoo procedures, a majority (61.8%) recognized this as a potential risk, while 38.3% were unsure or believed it was not a risk. In summary, the survey highlights a mixed level of understanding about hepatitis C transmission. While there is general awareness about some modes of transmission, such as through shared injection equipment and sexual contact, there are misconceptions, particularly regarding casual contact, airborne transmission, and the role of mosquitoes. Public health education and awareness campaigns may be needed to address and correct these misconceptions and enhance knowledge about hepatitis C transmission showed in table 3.

Table 5

Participants Knowledge about HCV Transmission Rout

Variables	Category	Frequency (%)
Is it possible for hepatitis C to be transmitted through casual forms of contact, such as kissing or hugging?	Yes No	143 (37.2) 242 (62.9)
Is there a risk of hepatitis C transmission through the sharing of injection equipment, like needles, syringes, or medicine spoons?	Yes No	285 (74) 100 (26.0)
Is it possible for mosquitoes to serve as a vector for the transmission of hepatitis C?	Yes No	92 (24) 293 (76.1)
Is it possible for Hepatitis C to be transmitted by direct contact between infected blood and non-infected blood?	Yes No	251 (65.1) 134 (34.9)
Is there a risk of airborne transmission of hepatitis C in confined environments such as crowded buses and elevators?	Yes No	151 (39.3) 234 (60.8)
Is sexual transmission considered the primary mode of transmission for hepatitis C?	Yes No	258 (67) 127 (33)
Can hepatitis C be transmitted to individuals using non-sterilized equipment during the process of receiving a tattoo?	Yes No	238 (61.8) 147 (38.3)
Can hepatitis C be acquired by individuals through the process of receiving a blood transfusion?	Yes No	265 (68.8) 120 (31.3)

Associated Risk Factors of HCV with Gender

Table 5 presents the results of a study examining various factors associated with hepatitis C infection, along with the odds ratios (OR) and p-values indicating the significance of these associations. Here's an interpretation of the findings: Individuals with a history of traveling abroad had 1.44 times higher odds of hepatitis C infection compared to those without such a history. Although the odds ratio suggests a moderate association, the p-value (0.086) indicates that this association is not statistically significant at the conventional significance level of 0.05. Those who received blood transfusions had significantly lower odds of hepatitis C infection with an odds ratio of 0.592, and this association is statistically significant (p-value = 0.011). This suggests that blood recipients are less likely to contract hepatitis C.

Individuals who reported being injectable drug users had a substantially higher risk of hepatitis C, with an odds ratio of 2.353. This association is highly significant (p-value = 0.001), indicating a strong link between injectable drug use and hepatitis C infection. Those with a history of smoking exhibited a significantly higher risk of hepatitis C infection, with an odds ratio of 3.300. This association is highly significant (p-value < 0.001), indicating a robust relationship between smoking and hepatitis C. Reusing needles did not show a statistically significant association with hepatitis C infection, as indicated by the odds ratio of 1.062 and a p-value of 0.516. Utilizing barber services did not exhibit a statistically significant association with hepatitis C infection, with an odds ratio of 1.229 and a p-value of 0.214.

Having undergone organ transplantation did not show a statistically significant association with hepatitis C infection, with an odds ratio of 0.722 and a p-value of 0.096. Undergoing major surgery did not exhibit a statistically significant association with hepatitis C infection, as indicated by an odds ratio of 0.876 and a p-value of 0.340. Having a family history of the disease did not show a statistically significant association with hepatitis C infection, with an odds ratio of 0.707 and a p-value of 0.104. Getting piercings did not show a statistically significant association with hepatitis C infection, with an odds ratio of 0.701 and a p-value of 0.061. Undergoing acupuncture treatments did not exhibit a statistically significant association with hepatitis C infection, with an odds ratio of 1.065 and a p-value of 0.437. Individuals who underwent dialysis had a significantly higher risk of hepatitis C infection, with an odds ratio of 1.515.

This association is statistically significant (p-value = 0.037). Those who had dental surgery had a significantly higher risk of hepatitis C infection, with an odds ratio of 1.471. This association is statistically significant (p-value = 0.003). In summary, this study indicates that several factors are associated with hepatitis C infection. Notably, injectable drug use, smoking history, receiving blood transfusions, and dental surgery are significantly associated with higher hepatitis C risk. On the other hand, factors like travel abroad history, barber services, organ transplantation, major surgery, disease family history, piercing, and acupuncture do not exhibit significant associations with hepatitis C infection in this population. These findings have implications for understanding risk factors and potential interventions for hepatitis C prevention and management.

Table 6

HCV Risk Factor Identification with Gender

Factors	Category	Gender		COR and 95% CI	*p*-value
		M	*F*		
Travel Abroad History	Yes	56	34	1.44 (.888-2.341)	0.086
	No	156	139		
Blood Received	Yes	129	125	.592(384-913)	0.011
	No	83	48		
Injectable Drug User	Yes	59	24	2.353(1.390-3.984)	0.001
	No	153	149		
Smoking History	Yes	99	36	3.300(2.092-5.207)	.000
	No	101	149		
Needles Reuse	Yes	97	260	1.062(.491-2.296)	.516
	No	15	13		
Barber	Yes	59	53	1.229(.787-1921)	.214
	No	141	132		
Organ Transplantation	Yes	59	46	.722(.459-1.134	.096
	No	141	139		
Major Surgery	Yes	45	40	.876(.539-1.423)	.340
	No	167	133		
Disease Family	Yes	39	43	.707(.433-1.156)	.104
	No	172	131		
Piercing	Yes	68	69	.701(.461-1.068)	.061
	No	124	104		
Acupuncture	Yes	61	67	1.065(.680-1.669)	.437
	No	131	126		
Dialysis	Yes	79	50	1.515(983-2.334)	.037
	No	130	126		
Dental Surgery	Yes	69	158	0.0492(.680-2.669)	.003
	No	142	16		

HCV Risk Factor Assessment with Locality

Table 6 presents the results of a study examining various factors associated with hepatitis C infection, categorized by locality (Urban and Rural). The odds ratios (OR) and p-values indicate the significance of these associations within each locality. Here's an interpretation of the findings: In both urban and rural areas, a history of traveling abroad did not show a statistically significant association with hepatitis C infection. The odds ratios for both localities were close to 1 (1.168 for urban and 0.726 for rural), and the p-values were greater than 0.05 (0.302). This suggests that travel history is not significantly linked to hepatitis C infection in either urban or rural populations. Similarly, the receipt of blood transfusions did not exhibit a statistically significant association with hepatitis C infection in either urban or

rural areas. The odds ratios were slightly above 1 (1.275 for urban and 0.835 for rural), and the p-values were greater than 0.05 (0.154). Injectable drug use showed a statistically significant association with hepatitis C infection, but interestingly, the association differed between urban and rural areas. In rural areas, injectable drug users had a significantly lower risk of hepatitis C (OR = 0.478, p-value = 0.003), while in urban areas, the association was not significant. Having a history of smoking did not exhibit a statistically significant association with hepatitis C infection in either urban or rural areas. The odds ratios were close to 1 (1.214 for urban and 0.797 for rural), and the p-values were greater than 0.05 (0.213). Reusing needles did not show a statistically significant association with hepatitis C infection in either urban or rural areas. The odds ratios were close to 1 (0.581 for urban and 1.94 for rural), and the p-values were greater than 0.05 (0.126). Utilizing barber services did not exhibit a statistically significant association with hepatitis C infection in either urban or rural areas. The odds ratios were close to 1 (1.062 for urban and 0.683 for rural), and the p-values were greater than 0.05 (0.239). Organ Transplantation, Major Surgery, Disease Family History, Piercing, Acupuncture: these factors did not show statistically significant associations with hepatitis C infection in either urban or rural areas. The odds ratios and p-values for these variables were not significant. Undergoing dialysis showed a statistically significant association with hepatitis C infection in both urban and rural areas. In urban areas, the odds ratio was 0.577 (indicating a lower risk of infection), and in rural areas, it was 0.376. Both localities had highly significant p-values (p = 0.008). Having dental surgery showed a statistically significant association with hepatitis C infection in both urban and rural areas. The odds ratios were 1.248 for urban and 0.906 for rural areas, and the p-values were highly significant (p = 0.0045). In summary, the study findings indicate that several factors are associated with hepatitis C infection, but the significance of these associations varies by locality. Injectable drug use, dialysis, and dental surgery were consistently associated with hepatitis C infection in both urban and rural areas. Other factors, such as travel history, blood transfusions, and smoking, did not show significant associations in either locality. This suggests that the risk factors for hepatitis C may vary between urban and rural populations, and targeted prevention strategies may be needed based on the local context.

Table 7
HCV Risk Factor Identification with Locality

Factors	**Category**	**Locality**		**COR and 95% CI**	***p*-value**
		U	*R*		
Travel Abroad History	Yes	49	40	1,168(.726-1.880)	0.302
	No	151	145		
Blood Received	Yes	137	116	1.275(.835-1945)	0.154
	No	64	68		
Injectable Drug User	Yes	32	51	.478(.290-.789)	.003
	No	169	133		
Smoking History	Yes	75	60	1.214(.797-1849)	.213
	No	126	124		
Needles Reuse	Yes	182	174	.581(.261-1.94)	.126
	No	19	10		
Barber	Yes	59	53	1.062(.683-1.653)	.239
	No	141	132		
Organ Transplantation	Yes	69	45	1.293(.822-2.033)	.160
	No	141	137		
Major Surgery	Yes	47	38	1.148(.706-1.865)	.333
	No	154	146		
Disease Family	Yes	41	41	.872(.534-1.424)	.336
	No	160	143		
Piercing	Yes	63	73	.699(.460-1.064)	.059
	No	137	111		
Acupuncture	Yes	61	46	1.317(.840-2.064)	.138
	No	139	138		

Dialysis	Yes	56	73	0.587(.376-.885)	.008
	No	145	111		
Dental Surgery	Yes	61	66	5.5204(.906-1.865)	.0045
	No	37	221		

Discussion

Demographic data on the surveyed population, including age, gender, province of residence, marital status, locality, educational qualifications, employment status, and family medical history. Notable findings include a relatively balanced gender distribution, a majority residing in the KPK province, a significant proportion being unemployed, and a limited family medical history of hepatitis C. Since there is no vaccination and no efficient treatment for HCV, the prevalence is higher in men (Babozai) and women (Kabal). One of the main methods for preventing and controlling HCV epidemics is to limit transmission (Niu, Zhang, & Tong, 2016). Updated figures that can direct community education and public health policy are provided by a recent worldwide systematic analysis of HCV prevalence and incidence in men who have sex with men (MSM) (Jin, Dore, & Matthews *et al.*, 2021). Highlights the surveyed population's awareness and misconceptions regarding hepatitis C transmission. While there is good awareness of certain transmission modes like shared injection equipment and sexual contact, there are notable misconceptions about casual contact and airborne transmission. This issue merits more research in the current setting of the global HCV outbreaks.

The group most vulnerable to HCV infection is new or young injecting drug users (IDUs) (Roy, Arruda, & Leclerc *et al*., 2012). My research indicates that a poor immune system is the reason for the high prevalence of positive HCV in the 61–70 age range, which sheds light on the awareness of hepatitis C treatment among the surveyed population. Though most people are aware that drugs are available and that there may be a cure, there are knowledge gaps on specifics of treatment, like the usage of direct-acting antivirals (DAAs) and the idea of a sustained 62 viral response 12 weeks after therapy (SVR12). In this sense, every blood transfusion presents a possible risk of transmission (Saeed, Iram, & Hussain *et al.*, 2016). Compared to my research, the total frequency was 23.66% in the two chosen districts Swat Tehsils (Babozai and Kabal), which is greater than in Lahore. Because the folks used soiled devices like razors, needles, and surgical instruments. The nations of Bangladesh, Pakistan, and India have the greatest contamination rates, ranging from 2% to 8% across all demographic groups. The province of Punjab exhibits the highest prevalence rate of HCV, with a recorded percentage of 6.7%. In contrast, the province of Khyber Pakhtunkhwa reports the lowest 63 prevalence rate, standing at 1.1%. Hepatitis C virus (HCV) recurrence is thought to be 5% common in the Sindh area and 1.5% common in the Baluchistan region (Basit, Rahim, & Ahmad *et al.*, 2014).

This study indicates that several factors are associated with hepatitis C infection. Notably, injectable drug use, smoking history, receiving blood transfusions, and dental surgery are significantly associated with higher hepatitis C risk. On the other hand, factors like travel abroad history, barber services, organ transplantation, major surgery, disease family history, piercing, and acupuncture do not exhibit significant associations with hepatitis C infection in this population. These findings have implications for understanding risk factors and potential 64 interventions for hepatitis C prevention and management. Individuals diagnosed with acute hepatitis C typically do not exhibit any noticeable symptoms. The bulk of research has shown higher rates (between 77% and 85%) of hepatitis C progression from the acute to the chronic stages. Still, the transition from acute disease to cirrhosis usually occurs gradually over a period of 20 to 40 years and affects between 5% and 25% of those infected with the hepatitis C virus (HCV). In those who have cirrhosis already, the yearly incidence of hepatocellular carcinoma varies from 1% to 4%. Of instances involving Hepatitis C virus (HCV) infections, 20.0% result in severe Hepatitis and 50.0% in acute Hepatitis. Twenty percent of patients with acute hepatitis go on to become cirrhosis (Antonelli, Ferri, & Galeazzi, *et al*., 2008). Acute hepatitis C (AHC) is the usual term for the six months after the Hepatitis C virus infection. More broadly, the six months after the virus was acquired are often referred to be the clinical manifestation of severe hepatitis C virus infection (Boesecke, Wedemeyer, & Rockstroh, 2012).

Conclusion

In conclusion of the study, the epidemiology and risk factors associated with Hepatitis C Virus (HCV) infection among the population visiting DHQ Hospital in Dera Ismail Khan, Pakistan, pose a multifaceted public health problem. The implementation of local data collection initiatives and the establishment of collaborative partnerships among healthcare officials, researchers, and community members are imperative to formulate precise interventions 69 aimed at mitigating HCV transmission and enhancing the overall health outcomes of the people residing in Dera Ismail Khan. The findings of this study, encompassing prevalence rates, demographic trends, and risk factor analyses, offer valuable insights into the specific dynamics of HCV infection in the region of Dera Ismail Khan. The discoveries provide a basis for evidence-based interventions, including enhanced infection control protocols, expanded availability of screening and treatment resources, and extensive public awareness initiatives, specifically designed to tackle the distinct obstacles encountered by the community in question.

Recommendations

The following suggestions are derived from the findings of a study conducted on the epidemiology and risk factors associated with Hepatitis C Virus (HCV) infection among individuals visiting DHQ Hospital in Dera Ismail Khan, Pakistan:

To mitigate the risk of contamination, it is imperative to establish and uphold stringent infection control protocols within healthcare facilities, specifically targeting the prevention of reusing syringes and needles that have been exposed to pathogens. Advocate for the utilization of disposable medical equipment and establish effective protocols for its appropriate disposal. To guarantee the accessibility of secure blood transfusions, it is imperative to establish stringent processes for blood screening and testing. To mitigate the transmission of the Hepatitis C Virus (HCV) through blood products, it is imperative to implement a system of monitoring and regulation for blood banks. Implement educational initiatives targeting healthcare personnel and patients to enhance their knowledge regarding safe injection practices and the potential hazards connected with incorrect utilization. There is a need to enhance the availability and accessibility of screening services for Hepatitis C Virus (HCV), particularly in geographically isolated regions. It is imperative to guarantee that individuals who have been identified with Hepatitis C Virus (HCV) are provided with enough access to suitable treatment and subsequent care. Implement public awareness efforts focused on the transmission, prevention, and significance of early detection and treatment of the Hepatitis C Virus (HCV). The focus should be directed at populations that are considered at-risk, such as individuals who partake in intravenous drug use and engage in risky sexual practices.

Limitations and Future Directions

The samples were drawn from one hospital in one city hence results and findings of this study could not be generalized. Therefore, it is suggested that in the future researchers could either add more public as well as private sector hospitals to understand the differences concerning the results and findings. Similarly, this study could be replicated with the same variables in other regions of the provinces, especially the tribal and hilly regions.

Acknowledgments

The researchers are indebted to the assistance provided by the hospital management and staff as well as the respondents in the collection of the data.

Declaration of Interest

The authors declare that there is no clash of interest.

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